

tenuis by Hubbard, 1884, and discussed under that name by Garman, has stood under the name *A. pusio* in the Hubbard and Schwarz collection and in Hubbard's unpublished notes for a long time. That *tenuis* was a *lapsus* for *pusio* in Hubbard's published note is evident from his allusion to Erhart's Cave, the type locality of the latter. In Garman's discussion, reference is also made to "*pusio* from Virginia and eastern Kentucky," and comparison is made of his new species, *A. horni*, with *A. pusio* Horn from the Carter Cave.

The four forms now under consideration are: (1) *A. pusio* Horn, 1868, known from the unique type collected by Cope in Erhardt's Cave, Montgomery Co., Virginia; (2) the unique specimen found in Luray Cavern, about 140 miles northeast of the type locality of *A. pusio*, by Hubbard and Schwarz, and here named *A. hubbardi*; (3) two specimens found in English Cave on the Powell River in Tennessee, about 200 miles southwest of the type locality of *A. pusio*; and (4) *A. horni* Garman, 1892, from crevices in the rocks and in cellars of Lexington, Kentucky. It is probable that the Carter Cave form will be found specifically distinct from *A. pusio*, but the writer has seen no specimens from this lot.

Unfortunately all structures of the type of *A. pusio* were not critically examined, but it seems to agree with the other three species in differing from other American *Anophthalmus* in their small size (less than 4 mm.), depressed form, transverse pronotum, and apical elytral striation, and in having only six setae at base of mentum. They will doubtless constitute a genus distinct from the other species for which Jeannel, 1920,² proposed two new generic names—*Neaphaenops* for *A. tellkampfi* and *Pseudanophthalmus* for *A. menetriesi* and its allies.

The four species here considered may be distinguished in the following table:

1. Apical recurved stria shorter, occupying apical seventh or eighth of elytral length; antennae shorter, joints 5 to 10, inclusive, measuring less than 1.4 mm.....2
- Apical recurved continuation of first (sutural) stria produced forward to apical fourth of elytral length, where it joins the third stria by an abrupt transverse sinuosity; the third, or subapical discal seta arising from a point at about anterior third of area thus inclosed, and forming apex of interval between second and third striae, which there unite and continue in a feeble stria, curved inward apically. Antennal joints 1 and 2 subequal in length and about a fourth shorter than joints 3 and 4, which are also equal; joints 5 to 10 longer, together measuring 1.6-1.7 mm. Length 4-4.2 mm., width 1.4-1.5 mm. English Cave, Powell River, Tennessee..... *A. engelhardti*, n. sp.

² JEANNEL, Bull. Soc. Entom. France 1920: 154. 1920.

2. Antennal joints 1, 2, 3 and 4 subequal, apex of the recurved apical stria bent internally to join the third stria opposite anterior edge of subapical setigerous puncture.....3
 Antennal joints 1 and 3 subequal in length, joint 2 about a fourth shorter than 3; apical stria broadly curved, but terminating in a broad, rounded shallow fossa not connected with third stria and a little in advance of subapical setigerous puncture. Length 3.3 mm., width 1.3 mm. Luray Cave, Virginia..... *A. hubbardi*, n. sp.
3. Form more depressed; first four antennal joints almost equal, joints 5 to 10 inclusive, measuring about 1.4 mm. Erhart's Cave, Montgomery Co., Virginia..... *A. pusio* Horn
 Form more convex; antennal joint 2 slightly shorter and 3 slightly longer than 1, joints 5 to 10, inclusive, measuring 1.1-1.25 mm.; basal constriction of head continuous and distinct across occiput. Length 3.7-4.0 mm., width 1.3 mm. Lexington, Kentucky..... *A. horni* Garman

The type of *A. pusio* Horn, 1868,³ preserved in the Academy of Natural Sciences, Philadelphia, has the pronotum more deeply impressed near posterior angles, causing the margins to be more strongly reflexed. No other specimen has been seen and those mentioned by Garman, 1892, from the Carter Cave of eastern Kentucky will probably prove to be a distinct species.

A. horni Garman, 1892,⁴ is represented by a series of six specimens in the U. S. National Museum collection, received from its author and labeled "Lexington, Ky. 10.9.92." In the original description he records the pronotal measurements as 0.72 mm. long, 0.8 mm. wide before middle, and 0.66 mm. wide at base.

In *A. hubbardi* (= *tenuis* Hubbard, 1884,⁵ lapsus for *pusio*; Garman, 1892, part) the pronotum is 0.65 mm. long, 0.81 mm. wide at apical fourth, and 0.60 mm. wide at base, the sides being feebly sinuate and almost evenly divergent from base to near apical fourth, thence strongly arcuate. The elytra are less convex, more densely pubescent with the striae marked on disc only by the feeble convexity of the intervals, although they are more deeply impressed basally. The tarsi are relatively shorter and stouter. The holotype (U. S. National Museum Cat. No. 40823) was collected more than forty years ago, an old note by Mr. H. G. Hubbard stating the "single specimen of *A. pusio* was found November 27, 1884, in Luray Cave, Page County, Virginia, among debris under a stairway and within twenty feet of an electric light." This species is more similar to *A. pusio* than to any other species known to me.

In *A. engelhardti* the pronotum is 0.82 mm. long by 0.95 mm. wide at apical third, and 0.75 mm. wide at base. The elytra are more convex and less densely pubescent, with the striae more definitely marked on disc. The more elongate antennae, more slender and elongate tarsi and larger size support the characters already given. The type and paratype (U. S. National Museum Cat. No. 40824) were collected in English Cave, Powell River, Tennessee, six miles south of Cumberland Gap, July 27, 1924, by Mr. George P. Engelhardt, after whom it is a pleasure to name the species.

³ HORN, Trans. Amer. Entom. Soc. 2: 125. 1868.

⁴ GARMAN, Science 20: 240-241. 1892.

⁵ HUBBARD, Proc. Entom. Soc. Washington 1: 16. 1884

ZOOLOGY.—*Ungella secta* n. gen., n. sp.; a nemic parasite of the Burmese *Oligochaete* (earthworm), *Eutyphoeus rarus*.¹ N. A. COBB, U. S. Department of Agriculture.

Ungella, n. gen.

Amphigonic nemas with protrusile, dorsally arcuate, hooked onchia (Fig. 1) and special cervical gland; oesophagus degenerate-diplogastroid; adults with posterior lateral pockets or "suckers;" 'm and 'f; males with two equal spicula and a gubernaculum, and an elongate pre- and post-anally ribbed bursa. Parasitic in earthworms. Proposed as type species is:

Ungella secta n. sp.

The transparent colorless cuticle is traversed by transverse striae, about one micron apart, hard to resolve even with high powers, at least in alcoholic specimens. In certain stages of the nema the striae are much more obvious and double in size. Though interrupted, the striae are not altered, on the lateral fields, where there are only faint single wings—non-existent or faint on the neck and anterior portion of the body, but somewhat readily seen along the middle of the body. The very slightly oblique longitudinal striae, due to the attachment of the musculature, are more readily visible than the transverse striae. (Fig. 3, *str longt*) Between the longitudinal striae are faint rows of dots, reminiscent of the cuticular markings of *Diplogaster*.

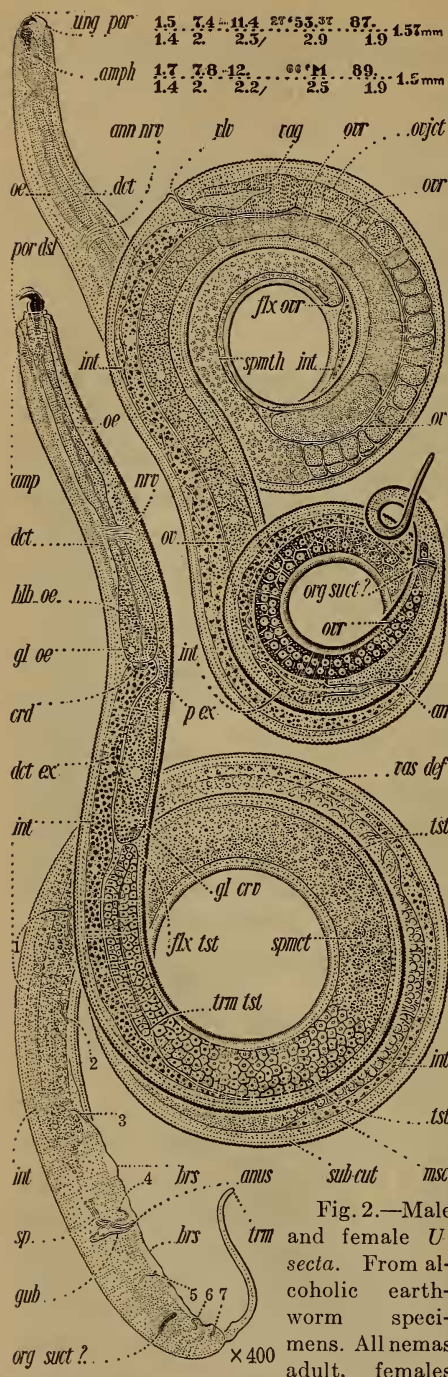
And here it may be said that, though valveless, the oesophagus also is reminiscent of *Diplogaster*; and that of all the free-living genera, *Diplogaster* is that to which *Ungella* seems most closely related. It is readily conceivable that the submedian duplex onchium (Fig. 1), could have been evolved from an armature such as characterizes one of the types of diplogastric pharynx.

Onchium. The duplex onchium of *Ungella* has its amalgamated roots movably imbedded in the head end of the nema backward for a distance equal to two-thirds the width of the head or more; it is assumed therefore that this represents the depth of the otherwise unarmed pharynx. The onchium, which can be exerted for the greater part of its length, is a strong refractive organ, colorless except distally, where it is yellowish; it is a conspicuous feature of the head, especially when protruded. The two equal claws of the onchium are joined rigidly in such a way as to make it impossible for them to be juxtaposed, and their internal structure makes plain that they represent the two ventrally submedian sectors of the oesophagus. Thus the onchium and its



Fig. 1.—*Ungella secta*. Side, dorsal and end views of the same head. M'br, the intussusception membrane.

¹ Investigation made in part at laboratories of the Bureau of Fisheries at Woods Hole, Massachusetts. Received January 23, 1928.



“hilt” have the general form of the ultimate two-clawed segment of a beetle’s tarsus. (See Fig. 1.) Rather weakly developed retractor muscles are attached to the amalgamated onchial apophyses. It seems not unlikely that the caudal “suckers” may also aid—as a base of resistance—in the use of the onchium, the object of which must be to claw; it must wound by clawing, hence the specific name *secta*. When the onchium is withdrawn and at rest, as in the female of Figure 2, the outer or distal parts of the two claws rest in special lateral depressions on the outside of the front of the head (see *conca* Fig. 1) and to that extent are not withdrawn into the head.

Oesophageal glands. The median dorsad pore in the front of the head, *por dsl*, is the exit of a large well developed special cervical gland, *gl crv*. The excretory pore of the renette, *p ex*, is farther back and ventral. There is an almost imperceptible short alteration in the oesophageal lining between the fore and after parts of the oesophagus,—probably the vestige of a median bulb. The indistinctly clavate, posterior, non-valvate, oesophageal swelling contains a single, bright, refractive, three-micron nucleus near the base in the dorsal sector, proving the presence of an oesophageal gland. Radial oesophageal muscles are only faintly to be seen.

Intestine. A cross-section of the intestine cuts through only about two relatively large cells. The refractive lining of the intestine often is distinctly to be seen. In the front portion of the body the wall of the intestine is hardly as thick as that of the body; here the lumen of the intestine often is more

Fig. 2.—Male and female *U. secta*. From alcoholic earthworm specimens. All nemas adult, females outnumbering males.

than twice as wide as the thickness of the intestinal wall.